



HULT
INTERNATIONAL
BUSINESS SCHOOL

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Course: Business Analysis with Structured Data

Program: MBAN - Dual Degree

Campus: San Francisco

Assignment: A1: SQL Analysis Assessment (Individual)

Introduction:

As a cohort, we chose to investigate whether dietary preferences have an impact on prices. People are choosing different dietary preferences to maintain their health or physical fitness as their concern for their health and well-being grows.

How then do we define dietary preferences, which are based on what we find to be the foods that we enjoy the most, find to be the most satisfying, and which meet the needs and desires of our bodies (*Colleen, 2021*)? These choices would be made based on how we feel about the food we want, whether our food choices keep us healthy and prevent us from contracting a disease or infection, and how it affects our physical, mental, and emotional well-being. Food preferences remain stable until adulthood. However, due to altered food preferences, the person's sense of taste and smell perceptions could change over the course of their lifetime (*Guzek et al., 2021*).

To define the price, we must establish that food pricing strategies promote the consumption of healthy foods as well as their effects on calorie consumption through the nature and quantity of foods purchased (*DiSantis et al., 2013*). Following extensive investigation and analysis, we have concluded that price is affected by the dietary preferences of consumers.

Do Dietary Preferences affect Price?

Yes! Dietary preferences affect the price. We used the ANOVA Single Factor model to analyze the variables: Dietary preferences (vegan, gluten-free, keto-friendly, etc.) and Prices and for Dietary preferences and Price/gram and found that the p-value was less than 0.05 (alpha) in both cases, so we reject the null hypothesis (i.e., dietary preferences do not have a significant

impact on prices) and accept the alternative hypothesis (i.e., dietary preferences have a significant impact on prices).

Additionally, we used the z-scores and t-test (using t-scores and df value to determine the p-value) models to analyze dietary preferences and price ranges, and we reached the same conclusion of rejecting the null hypothesis and accepting the alternative hypothesis.

By using the ANOVA Two Factor without Replication model to analyze the variables: Category (produce, dairy, eggs, etc.) and Prices, we also concluded that the alternative hypothesis should be accepted and the null hypothesis should be rejected because the p-value is less than 0.05 (alpha).

As a result, we conclude that dietary preferences have a significant influence on prices. Whole Foods has significant pricing advantages due to the dietary preferences that would draw customers to the brand and make their prices competitive with the other brands in the market (*Momin, 2022*).

Actionable Insights:

More options that are gluten-free, vegan, plant-based and organic, and free of genetically modified organisms should be accessible at Whole Foods. According to the FDA's regulatory definition, gluten-free products are currently worth \$5.6 billion, and by 2025, they are expected to reach \$8.3 billion (*Chan, 2021*). The \$22 billion global vegan food market is expected to grow over the coming years, so they should also invest in vegan and plant-based alternatives (*Chan, 2021*). The next market that Wholefoods should concentrate on is organic and non-GMO because consumers are concerned about how health will affect their products and look for more natural farming practices.

Blockchain is a promising technology for enabling traceability in the food supply chain and it cannot be hacked, modified, or corrupted in any way, so Wholefoods can also incorporate it. They should also include inventory management tools that can help you control and enable real-time inventory visibility (*Asaad, 2022*). Packaging is a crucial component of sustainability. Environmentally friendly packaging is typically recyclable, compostable, lighter, and more often reusable (*Nature Conservancy, 2020*).

Appendix:

Average prices by dietary preferences

total_mean	vegan_mean	glutenfree_mean	ketofriendly_mean	vegetarian_mean	organic_mean	dairyfree_mean	sugarconscious_mean
10.34	7.43	10	9.36	7.86	6.25	7.9	6.9

paleofriendly_mean	wholefoodsdiet_mean	lowsodium_mean	kosher_mean	lowfat_mean
8.65	6.74	5.55	8.01	6.68

Median prices by dietary preferences

total_median	vegan_median	glutenfree_median	ketofriendly_median	vegetarian_median	organic_median	dairyfree_median
5.99	4.19	4.99	5.99	4.99	5	5

sugarconscious_median	paleofriendly_median	wholefoodsdiet_median	lowsodium_median	kosher_median	lowfat_median
4.79	5	5.29	3.99	5.99	4.79

Mode prices by dietary preferences

total_mode	mode	glutenfree_mode	ketofriendly_mode	vegetarian_mode	organic_mode	dairyfree_mode	sugarconscious_mode
6.99	1.99	6.49	5.99	6.99	6.99	6.99	6.99

paleofriendly_mode	wholefoodsdiet_mode	lowsodium_mode	kosher_mode	lowfat_mode
6.99	3.99	1.99	6.99	6.99

The standard deviation of prices by dietary preferences

totalprice_stddev	vegan_stddev	glutenfree_stddev	ketofriendly_stddev	vegetarian_stddev	organic_stddev	dairyfree_stddev
11.03	11.67	15.57	13.13	11.85	6.45	11.46

sugarconscious_stddev	paleofriendly_stddev	wholefoodsdiet_stddev	lowsodium_stddev	kosher_stddev	lowfat_stddev
10.19	11.7	6.36	7.84	11.97	10.44

The variance of prices by dietary preferences

totalprice_variance	vegan_variance	glutenfree_variance	ketofriendly_variance	vegetarian_variance	organic_variance	dairyfree_variance
121.67	136.2	242.47	172.34	140.43	41.6	131.41
sugarconscious_variance	paleofriendly_variance	wholefoodsdiet_variance	lowsodium_variance	kosher_variance	lowfat_variance	
103.73	136.86	40.51	61.42	143.27	108.99	

Z-scores of all products

product	zscore_price
Ultimate Omega Liquid	1.63
Bone Strength Take Care	1.57
Vanilla Flavor Sport Performance Protein	1.45
Grass Fed Chocolate Whey Sport Protein Powder	1.32
Every Mans One Daily Whole-Food Multivitamin	1.3
Dr Formulated Once Daily Probiotics	1.02
Unflavored Collagen Peptides	1

Z-scores of vegan products

product	zscore_vegan
Bone Strength Take Care	5.32
Vanilla Flavor Sport Performance Protein	4.93
Every Mans One Daily Whole-Food Multivitamin	4.46
Dr Formulated Once Daily Probiotics	3.56
The Original Green Superfood	2.79
GlutenEase	2.45
Digestion Enzymes Papaya	1.85
Original Plain Fresh Coconut Water Probiotic	1.72
Organic Flax Oil	1.55

Z-scores of gluten-free products

product	zscore_glutenfree
Bone Strength Take Care	3.82
Grass Fed Chocolate Whey Sport Protein Powder	3.21
Every Mans One Daily Whole-Food Multivitamin	3.18
Dr Formulated Once Daily Probiotics	2.5
Unflavored Collagen Peptides	2.44
Unflavored Marine Collagen	1.99
The Original Green Superfood	1.93
Strawberry Dairy Probiotic	1.6

Z-scores of keto-friendly products

product	zscore_ketofriendly
Ultimate Omega Liquid	4.77
Vanilla Flavor Sport Performance Protein	4.24
Grass Fed Chocolate Whey Sport Protein Powder	3.86
Unflavored Collagen Peptides	2.94
Unflavored Marine Collagen	2.41
The Original Green Superfood	2.33
Original Plain Fresh Coconut Water Probiotic	1.38
Organic Flax Oil	1.23

Z-scores of vegetarian products

product	zscore_vegetarian
Bone Strength Take Care	5.2
Vanilla Flavor Sport Performance Protein	4.82
Grass Fed Chocolate Whey Sport Protein Powder	4.4
Every Mans One Daily Whole-Food Multivitamin	4.36
Dr Formulated Once Daily Probiotics	3.47
The Original Green Superfood	2.71
GlutenEase	2.37
Organic Vanilla Plant Protein Powder	2.08
Digestion Enzymes Papaya	1.78
Original Plain Fresh Coconut Water Probiotic	1.66
Organic Flax Oil	1.49
Organic Hemp Hearts	0.94

Z-scores of organic products

product	zscore_organic
The Original Green Superfood	5.23
Organic Vanilla Plant Protein Powder	4.07
Organic Flax Oil	2.98
Organic Hemp Hearts	1.97
Organic Matcha Powder	1.35
Organic Hulled Hemp Seed	1.2
Organic Wtg Holiday Chai	1.04
"Sandwich Bread	0.97

Z-scores of dairy-free products

product	zscore_dairyfree
Ultimate Omega Liquid	5.59
Bone Strength Take Care	5.37
Vanilla Flavor Sport Performance Protein	4.98
Every Mans One Daily Whole-Food Multivitamin	4.5
Dr Formulated Once Daily Probiotics	3.58
Unflavored Collagen Peptides	3.5
Unflavored Marine Collagen	2.89
The Original Green Superfood	2.8
GlutenEase	2.45
Organic Vanilla Plant Protein Powder	2.15
Digestion Enzymes Papaya	1.84
Original Plain Fresh Coconut Water Probiotic	1.71
Organic Flax Oil	1.53

Z-scores of sugar-conscious products

product	zscore_sugarconscious
Vanilla Flavor Sport Performance Protein	5.7
Grass Fed Chocolate Whey Sport Protein Powder	5.21
The Original Green Superfood	3.25
Original Plain Fresh Coconut Water Probiotic	2.02
Boneless Beef New York Strip Steak	1.29
Organic Hemp Hearts	1.19

Z-scores of paleo-friendly products

product	zscore_paleofriendly
Vanilla Flavor Sport Performance Protein	4.82
Dr Formulated Once Daily Probiotics	3.45
Unflavored Collagen Peptides	3.36
Unflavored Marine Collagen	2.76
The Original Green Superfood	2.68
GlutenEase	2.34
Original Plain Fresh Coconut Water Probiotic	1.61
Organic Flax Oil	1.44

Z-scores of wholefoods diet products

product	zscore_wholefoodsdiet
The Original Green Superfood	5.22
Original Plain Fresh Coconut Water Probiotic	3.26
Boneless Beef New York Strip Steak	2.08
Organic Hemp Hearts	1.93
Organic Hundred Mile Blend Coffee	1.61
Verve Seabright House Blend Whole Bean Coffee	1.42
Atlantic Salmon Fillet	1.3
Pavino Cheese	1.3
Organic Matcha Powder	1.3
Organic Hulled Hemp Seed	1.14
Boneless Beef New York Strip Steak	1.06
Organic Dried Fruit California Raisins	1.05
Garlic and Herb Seed Crackers	1.05
Organic Thick And Chunky Mild Salsa	1.05

Z-scores of low-sodium products

product	zscore_lowsodium
Grass Fed Chocolate Whey Sport Protein Powder	6.95
The Original Green Superfood	4.39
Strawberry Dairy Probiotic	3.76
Boneless Beef New York Strip Steak	1.84
Organic Hemp Hearts	1.72
Verve Seabright House Blend Whole Bean Coffee	1.31
Atlantic Salmon Fillet	1.2
Organic Matcha Powder	1.2
Tiramisu Cake	1.08
Organic Hulled Hemp Seed	1.08

Z-scores of kosher products

product	zscore_kosher
Bone Strength Take Care	0.81
Every Mans One Daily Whole-Food Multivitamin	0.66
Unflavored Collagen Peptides	0.49
GlutenEase	0.31
Cabernet Sauvignon	0.23
Organic Mini Dark Chocolate Peanut Butter Cups	0.23
Dark Chocolate Sea Salt Caramels	0.23
Salted Restaurant Style Tortilla Chips	0.23
Vegan White Cheddar Puffs	0.23
Gluten Free Mini Pretzels	0.23
Garlic and Herb Seed Crackers	0.23
Organic Oatmeal Chocolate Chip Mini Macrobars...	0.23
Organic Peanut Butter Chocolate Chip Mini Macr...	0.23

Z-scores of low-fat products

product	zscore_lowfat
Vanilla Flavor Sport Performance Protein	5.59
Grass Fed Chocolate Whey Sport Protein Powder	5.11
Strawberry Dairy Probiotic	2.71
Verve Seabright House Blend Whole Bean Coffee	0.87
Organic Matcha Powder	0.8
Beef Pastrami	0.7

Range of prices by dietary preferences

total_range	vegan_range	glutenfree_range	ketofriendly_range	vegetarian_range	organic_range	dairyfree_range	sugarconscious_range
71.99	69.46	69.49	71.99	69.46	39.99	71.99	64.99

paleofriendly_range	wholefoodsdiet_range	lowsodium_range	kosher_range	lowfat_range
64.99	39.99	59.99	69.46	64.94

Histogram price bins for vegan products

price_bins	no_of_products
0 - 500	37
1001 - 2000	4
3001 - 4000	2
4001 - 5000	3
5001 - 7000	3
501 - 1000	19

Histogram price bins for gluten-free products

price_bins	no_of_products
0 - 500	37
1001 - 2000	4
3001 - 4000	2
4001 - 5000	3
5001 - 7000	3
501 - 1000	19

Histogram price bins for keto-friendly products

price_bins	no_of_products
0 - 500	43
1001 - 2000	14
2001 - 3000	2
3001 - 4000	1
4001 - 5000	2
5001 - 6000	1
501 - 1000	32
6001 - 7500	2

Histogram price bins for vegetarian products

price_bins	no_of_products
0 - 500	80
1001 - 2000	12
2001 - 3000	3
3001 - 4000	3
4001 - 5000	1
5001 - 7000	4
501 - 1000	47

Histogram price bins for organic products

price_bins	no_of_products
0 - 500	43
1001 - 2000	7
2001 - 3000	1
3001 - 4000	2
501 - 1000	32

Histogram price bins for dairy-free products

price_bins	no_of_products
0 - 500	103
1001 - 2000	25
2001 - 3000	3
3001 - 4000	3
4001 - 5000	3
5001 - 7500	4
501 - 1000	64

Histogram price bins for sugar-conscious products

price_bins	no_of_products
0 - 500	53
1001 - 2000	12
2001 - 3000	1
3001 - 4000	1
5001 - 7000	2
501 - 1000	29

Histogram price bins for paleo-friendly products

price_bins	no_of_products
0 - 500	47
1001 - 2000	13
2001 - 3000	2
3001 - 4000	2
4001 - 5000	3
5001 - 7000	1
501 - 1000	25

Histogram price bins for wholefoods diet products

price_bins	no_of_products
0 - 500	39
1001 - 2000	12
2001 - 3000	1
3001 - 4000	1
501 - 1000	25

Histogram price bins for low-sodium products

price_bins	no_of_products
0 - 500	75
1001 - 2000	8
3001 - 4000	2
5001 - 7000	1
501 - 1000	30

Histogram price bins for kosher products

price_bins	no_of_products
0 - 500	37
1001 - 2000	5
2001 - 3000	2
3001 - 4000	1
4001 - 5000	1
5001 - 7000	2
501 - 1000	31

Histogram price bins for low-fat products

price_bins	no_of_products
0 - 500	44
1001 - 2000	3
3001 - 4000	1
5001 - 7000	2
501 - 1000	24

ANOVA: Two Factor without replication for categories and price

ANOVA						
	Source of Variation	SS	df	MS	F	P-value
Rows		295978181	266	1112699.93	0.99980977	0.49068392
Columns		417576333	12	34798027.7	31.2675566	0.00
Error		3552413959	3192	1112911.64		1.15403301
Total		4265968474	3470			1.75520014

ANOVA: Single factor for dietary preferences and price

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
vegan	267	130	0.48689139	0.25076737
glutenfree	267	68	0.25468165	0.19053251
ketofriendly	267	97	0.36329588	0.23218158
vegetarian	267	150	0.56179775	0.24710653
organic	267	85	0.31835206	0.21781983
dairyfree	267	205	0.76779026	0.17895863
sugarconscious	267	98	0.3670412	0.23319535
paleofriendly	267	93	0.34831461	0.22784489
wholefoodsdiet	267	78	0.29213483	0.20756949
lowsodium	267	116	0.43445693	0.24662781
kosher	267	80	0.29962547	0.21063896
lowfat	267	74	0.27715356	0.20109262
price	267	347646	1302.04494	14467637

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	417576333	12	34798027.7	31.2680141	0.00	1.75496714
Within Groups	3848392141	3458	1112895.36			
Total	4265968474	3470				

ANOVA: Single factor for dietary preferences and price/gram

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
vegan	135	59	0.43703704	0.24787175
glutenfree	135	35	0.25925926	0.19347706
ketofriendly	135	41	0.3037037	0.21304588
vegetarian	135	79	0.58518519	0.244555
organic	135	43	0.31851852	0.21868436
dairyfree	135	93	0.68888889	0.2159204
sugarconscious	135	44	0.32592593	0.22133776
paleofriendly	135	39	0.28888889	0.20696517
wholefoodsdiet	135	46	0.34074074	0.22631288
lowsodium	135	55	0.40740741	0.2432283
kosher	135	36	0.26666667	0.19701493
lowfat	135	40	0.2962963	0.21006081
Price/gram	135	5.24397872	0.03884429	0.00452308

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	40.964295	12	3.41369125	16.7907796	0.00	1.75772243
Within Groups	354.161648	1742	0.20330749			
Total	395.125943	1754				

T-table

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
Z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

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